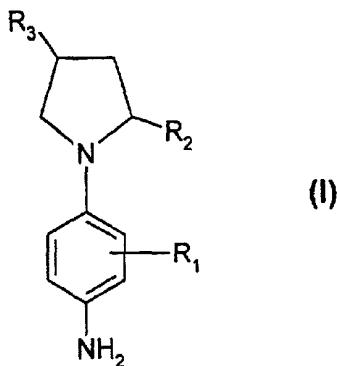


**WHAT IS CLAIMED:**

1. A ready-to-use composition for oxidation dyeing of keratinous fibers comprising, in a medium suitable for dyeing:
  - (1) at least one enzymatic oxidizing system comprising at least one enzyme chosen from 2 electron oxidoreductases, 4 electron oxidoreductases, and peroxidases; and
  - (2) at least one oxidation dye precursor chosen from 1-(4-aminophenyl)pyrrolidines of formula (I) and acid addition salts thereof:



wherein:

$R_1$  is chosen from a hydrogen atom, ( $C_1-C_6$ )alkyl groups, ( $C_1-C_5$ )monohydroxyalkyl groups, and ( $C_2-C_5$ )polyhydroxyalkyl groups;

$R_2$  is chosen from a hydrogen atom, a  $-CONH_2$  group, ( $C_1-C_5$ )monohydroxyalkyl groups, and ( $C_2-C_5$ )polyhydroxyalkyl groups;

$R_3$  is chosen from a hydrogen atom, and a hydroxyl group.

2. A composition according to claim 1, wherein said  $R_1$ , said  $R_2$  and said  $R_3$  are each a hydrogen atom.

3. A composition according to claim 1, wherein said  $R_1$  and said  $R_3$  are each a hydrogen atom and said  $R_2$  is a  $-CH_2OH$  group.

4. A composition according to claim 1, wherein said R<sub>1</sub> is a hydrogen atom, said R<sub>2</sub> is a -CH<sub>2</sub>OH group and said R<sub>3</sub> is a hydroxyl group.

5. A composition according to Claim 1, wherein said R<sub>1</sub> and said R<sub>3</sub> are each a hydrogen atom and said R<sub>2</sub> is a -CONH<sub>2</sub> group.

6. A composition according to claim 1, wherein said acid addition salts are chosen from hydrochlorides, hydrobromides, sulphates, tartrates, lactates and acetates.

7. A composition according to claim 1, wherein said at least one oxidation dye precursor chosen from the 1-(4-aminophenyl)pyrrolidines of formula (I) and acid addition salts thereof is present in said composition in an amount ranging from 0.001 to 10% by weight relative to the total weight of said composition.

8. A composition according to claim 7, wherein said at least one oxidation dye precursor chosen from the 1-(4-aminophenyl)pyrrolidines of formula (I) and acid addition salts thereof is present in said composition in an amount ranging from 0.01 to 8% by weight of the total weight of said composition.

9. A composition according to claim 1, further comprising at least one corresponding donor when said 2 electron oxidoreductases are present in said composition, wherein said 2 electron oxidoreductases are chosen from pyranose oxidases, glucose oxidases, glycerol oxidases, lactate oxidases, pyruvate oxidases, uricases, choline oxidases, sarcosine oxidases, bilirubin oxidases and amino acid oxidases.

10. A composition according to claim 1, wherein said 2 electron oxidoreductases are present from 0.01 to 20% by weight relative to the total weight of said composition.

11. A composition according to claim 10, wherein said 2 electron oxidoreductases are present from 0.1 to 5% by weight relative to the total weight of said composition.

12. A composition according to claim 1, wherein said 4 electron oxidoreductases are chosen from laccases, tyrosinases, catechol oxidases and polyphenol oxidases.

13. A composition according to claim 12, wherein said laccases are chosen from laccases of plant, laccases of animal origin, laccases of fungal origin, laccases of bacterial origin and laccases of biotechnological origin.

14. A composition according to claim 13, wherein said laccases of plant origin are chosen from laccases extracted from Anacardiaceae, Podocarpaceae, Rosmarinus off., Solanum tuberosum, Iris sp., Coffea sp., Daucus carota, Vinca minor, Persea americana, Catharenthus roseus, Musa sp., Malus pumila, Gingko biloba, Monotropa hypopithys, Aesculus sp., Acer pseudoplatanus, Prunus persica and Pistacia palaestina.

15. A composition according to claim 13, wherein said laccases are chosen from plant origin and biotechnological origin.

16. A composition according to claim 15, wherein said laccases are chosen from the laccases extracted from *Polyporus versicolor*, *Rhizoctonia praticola*, *Rhus vernicifera*, *Scytalidium*, *Polyporus pinsitus*, *Myceliophthora thermophila*, *Rhizoctonia solani*, *Pyricularia oryzae*, *Trametes versicolor*, *Fomes fomentarius*, *Chaetomium thermophile*, *Neurospora crassa*, *Colorius versicol*, *Botrytis cinerea*, *Rigidoporus lignosus*, *Phellinus noxius*, *Pleurotus ostreatus*, *Aspergillus nidulans*, *Podospora anserina*, *Agaricus bisporus*, *Ganoderma lucidum*, *Glomerella cingulata*, *Lactarius piperatus*, *Russula delica*, *Heterobasidion annosum*, *Thelephora terrestris*, *Cladosporium cladosporioides*, *Cerrena unicolor*, *Coriolus hirsutus*, *Ceriporiopsis subvermispora*, *Coprinus cinereus*, *Panaeolus papilionaceus*, *Panaeolus sphinctrinus*, *Schizophyllum commune*, *Dichomitus squalens*, and variants thereof.

17. A composition according to claim 1, wherein said 4 electron oxidoreductases are present from 0.01 to 20% by weight relative to the total weight of said composition.

18. A composition according to claim 17, wherein said 4 electron oxidoreductases are present from 0.1 to 5% by weight relative to the total weight of said composition.

19. A composition according to Claim 1, wherein said peroxidases are chosen from simplex peroxidases and catalases.

20. A composition according to claim 1, further comprising at least one corresponding donor when said peroxidases are present in said composition, wherein said peroxidases are chosen from NADH peroxidases, fatty acid peroxidases, NADPH peroxidases, cytochrome c peroxidases, iodide peroxidases, chloride peroxidases, L-ascorbates and glutathione peroxidases.

21. A composition according to claims 1, wherein said peroxidases are chosen from peroxidases of plant, peroxidases of animal, peroxidases of fungal, peroxidases of bacterial and peroxidases of biotechnological origin.

22. A composition according to Claim 21, wherein said peroxidases are chosen from peroxidases obtained from apple, apricot, barley, black radish, beet, cabbage, carrot, corn, cotton, garlic, grape, mint, rhubarb, soy bean, spinach, ink cap, bovine milk, *Acetobacter peroxidans* microorganisms, *Staphylococcus faecalis* microorganisms and *Arthromyces ramosus* microorganisms.

23. A composition according to claim 1, wherein said peroxidases are present from 0.0001 to 20% by weight relative to the total weight of said composition.

24. A composition according to claim 23, wherein said peroxidases are present from 0.001 to 10% by weight relative to the total weight of said composition.

25. A composition according to claim 1, further comprising at least one coupler chosen from meta-aminophenols, meta-phenylenediamines, meta-diphenols,

naphthols, heterocyclic couplers, and acid addition salts of any of the foregoing compounds.

26. A composition according to claim 25, wherein said at least one coupler is chosen from 2,4-diamino-1-( $\beta$ -hydroxyethoxy)benzene, 2-methyl-5-aminophenol, 5-N-( $\beta$ -hydroxyethyl)amino-2-methylphenol, 3-aminophenol, 1,3-dihydroxybenzene, 1,3-dihydroxy-2-methylbenzene, 4-chloro-1,3-dihydroxybenzene, 2-amino-4-( $\beta$ -hydroxyethylamino)-1-methoxybenzene, 1,3-diaminobenzene, 1,3-bis-(2,4-diaminophenoxy)propane, sesamol, 1-amino-2-methoxy-4,5-methylenedioxybenzene,  $\alpha$ -naphthol, 6-hydroxyindole, 4-hydroxyindole, 4-hydroxy-N-methylindole, 6-hydroxyindoline, 2,6-dihydroxy-4-methylpyridine, 1-H-3-methylpyrazol-5-one, 1-phenyl-3-methylpyrazol-5-one, 2-amino-3-hydroxypyridine, 3,6-dimethylpyrazolo[3,2-c]-1,2,4-triazole, 2,6-dimethylpyrazolo[1,5-b]-1,2,4-triazole and acid addition salts of any of the foregoing compounds.

27. A composition according to claim 25, said at least one coupler is present in an amount ranging from 0.0001 to 15% by weight relative to the total weight of said composition.

28. A composition according to claim 1, further comprising at least one direct dye chosen from neutral, cationic, and anionic nitro dyes, cationic, and anionic azo dyes and cationic, and anionic anthraquinone dyes.

29. A composition according to claim 28, wherein said at least one direct dye is present in an amount ranging from 0.001 to 20% relative to the total weight of the composition.

30. A composition according to claim 29, wherein said at least one direct dye is present in an amount ranging from 0.01 to 10% relative to the total weight of the composition.

31. A composition according to claim 1, wherein said medium suitable for dyeing is chosen from water and a mixture of water and at least one organic solvent.

32. A composition according to Claim 31, wherein said at least one organic solvent is present in an amount ranging from 1 to 40% by weight relative to the total weight of said composition.

33. A composition according to claim 1, further comprising at least one nonionic surfactant present in an amount of at least 0.01% by weight relative to the total weight of said composition.

34. A composition according to claim 1, further comprising at least one reducing agent present in an amount of at least 0.05% by weight relative to the total weight of said composition.

35. A composition according to claim 1, further comprising at least one polymer chosen from cationic polymers and amphoteric polymers.

36. A composition according to claim 35, wherein said at least one polymer is present in an amount of at least 0.01% by weight relative to the total weight of said composition.

37. A composition according to claim 1, wherein said composition has a pH ranging from 3 to 11.

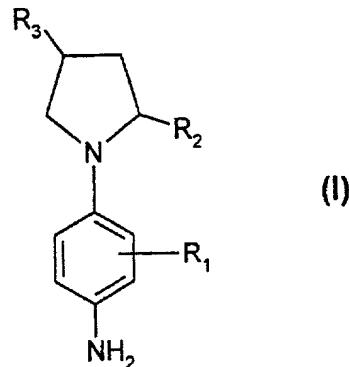
38. A composition according to claim 37, wherein said composition has a pH ranging from 4 to 9.

39. A composition according to claim 1, further comprising at least one agent for adjusting pH chosen from acidifying agents and alkalinizing agents.

40. A composition according to claim 1, wherein said composition is chosen from a liquid, a cream, a gel, and any other form appropriate for dyeing keratinous fibers, further wherein said composition is optionally pressurized.

41. A method for dyeing keratinous fibers comprising:  
(1) applying to said fibers at least one ready-to-use dyeing composition comprising, in a medium suitable for dyeing:

- (i) at least one enzymatic oxidizing system comprising at least one enzyme chosen from 2 electron oxidoreductases, 4 electron oxidoreductases, and peroxidases; and
- (ii) at least one oxidation dye precursor chosen from 1-(4-aminophenyl)pyrrolidines of formula (I) and acid addition salts thereof:



wherein:

R<sub>1</sub> is chosen from a hydrogen atom, (C<sub>1</sub>-C<sub>6</sub>)alkyl groups, (C<sub>1</sub>-C<sub>5</sub>)monohydroxyalkyl groups, and (C<sub>2</sub>-C<sub>5</sub>)polyhydroxyalkyl groups;

R<sub>2</sub> is chosen from a hydrogen atom, a -CONH<sub>2</sub> group, (C<sub>1</sub>-C<sub>5</sub>)monohydroxyalkyl groups, and (C<sub>2</sub>-C<sub>5</sub>)polyhydroxyalkyl groups;

R<sub>3</sub> is chosen from a hydrogen atom, and a hydroxyl group,;

- (2) developing a color; and
- (3) rinsing said fibers and optionally shampooing and optionally further rinsing said fibers;
- and
- (4) drying said fibers, wherein said method has an application temperature ranging from 20-80 °C.

42. A method according to claim 41, wherein said application temperature ranges from 20 and 50°C.

43. A method according to Claim 41, wherein the time for developing said color ranges from 1 to 60 minutes.

44. A method according to Claim 43, wherein the time for developing said color ranges from 5 to 30 minutes.

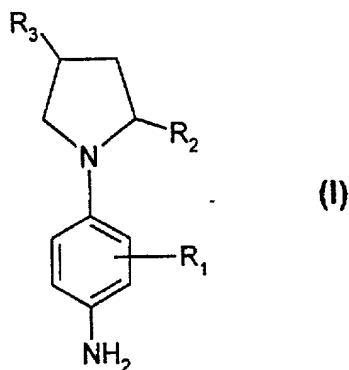
45. A method for dyeing keratinous fibers comprising:

(1) storing a composition (A) comprising, in a medium suitable for dyeing:

(i) at least one enzymatic oxidizing system comprising at least one enzyme chosen from 2 electron oxidoreductases, 4 electron oxidoreductases, and peroxidases;

(2) storing, separately from said composition (A), a composition (B) comprising, in a medium suitable for dyeing:

(ii) at least one oxidation dye precursor chosen from 1-(4-aminophenyl)pyrrolidines of formula (I) and acid addition salts thereof:



wherein:

R<sub>1</sub> is chosen from a hydrogen atom, (C<sub>1</sub>-C<sub>6</sub>)alkyl groups,

(C<sub>1</sub>-C<sub>5</sub>)monohydroxyalkyl groups, and (C<sub>2</sub>-C<sub>5</sub>)polyhydroxyalkyl groups;

R<sub>2</sub> is chosen from a hydrogen atom, a -CONH<sub>2</sub> group, (C<sub>1</sub>-C<sub>5</sub>)monohydroxyalkyl groups, and (C<sub>2</sub>-C<sub>5</sub>)polyhydroxyalkyl groups;

$R_3$  is chosen from a hydrogen atom, and a hydroxyl group;

(3) combining said composition (A) and said composition (B) together just prior to use, to produce a mixture;

(4) applying said mixture to said fibers;

(5) developing a color; and

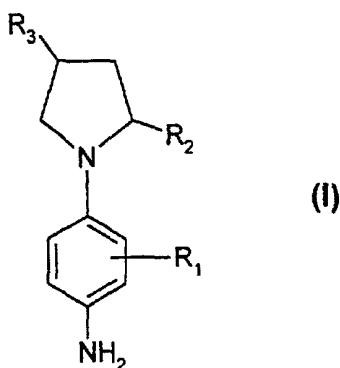
(6) rinsing said fibers and optionally shampooing and optionally further rinsing said fibers; and

(7) drying said fibers.

46. A kit comprising at least two compartments, wherein:

(1) a first compartment comprises, in a medium suitable for dyeing:  
at least one enzymatic oxidizing system comprising: at least one enzyme chosen from 2 electron oxidoreductases, 4 electron oxidoreductases, and peroxidases; and

(2) a second compartment comprises, in a medium suitable for dyeing:  
at least one oxidation dye precursor chosen from 1-(4-aminophenyl)pyrrolidines of formula (I) and acid addition salts thereof:



wherein:

$R_1$  is chosen from a hydrogen atom, ( $C_1-C_6$ )alkyl groups, ( $C_1-C_5$ )monohydroxyalkyl groups, and ( $C_2-C_5$ )polyhydroxyalkyl groups;

$R_2$  is chosen from a hydrogen atom, a  $-CONH_2$  group,  $(C_1-C_5)$ monohydroxyalkyl groups, and  $(C_2-C_5)$ polyhydroxyalkyl groups;

$R_3$  is chosen from a hydrogen atom, and a hydroxyl group.

47. A composition according to claim 1, further comprising at least one additional oxidation base provided that said at least one additional oxidation base is other than said at least one oxidation precursor of formula (I).

48. A composition according to claim 47, wherein said at least one additional oxidation base is presenting an amount ranging from 0.001 to 15% by weight relative to the total weight of said composition.